

2025/02/19

Appendix B

Claims as Amended February 19, 2002

Insertions And Deletions Shown

CLAIMS

1/ (amended). A pipe ~~or the like~~, of the type comprising:

- a concrete cylinder ~~(2)~~ possessing at least one annular end ~~(3)~~ of determined longitudinal axis ~~(9)~~, defined ~~in particular~~ by a longitudinal outside peripheral face ~~(12)~~ and by a transverse front face ~~(11)~~;

- a female end ring ~~(4)~~ coaxial with said end ~~(3)~~ and secured thereto, the ring consisting in:

- firstly a longitudinal ferrule ~~(5)~~ for securing to the cylinder ~~(2)~~, the ferrule being defined ~~in particular~~ by a longitudinal inside peripheral face ~~(23)~~ fitting snugly against said outside peripheral face ~~(12)~~ in the immediate vicinity of said front face ~~(11)~~; and

- secondly a longitudinal skirt ~~(6)~~ projecting longitudinally over said front face ~~(11)~~ to engage coaxially on a male endpiece ~~(7)~~ of another pipe ~~(8)~~ ~~or the like~~,

wherein ~~characterized in that~~ the ferrule ~~(5)~~ is in a state of circumferential elastic tension providing sealing relative to said outside peripheral face ~~(12)~~ by said inside peripheral face applying thereagainst transverse pressure which is circumferentially distributed in continuous manner.

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2/ (amended). A pipe ~~or the like~~ according to claim 1, ~~characterized in that~~ wherein said circumferential elastic tension is such that said inside peripheral face ~~(23)~~ is fastened, at least in part, to said outside peripheral face ~~(12)~~ by the mutual friction effect that results from said transverse pressure.

3/ (amended). A pipe ~~or the like~~ according to claim 2, ~~wherein characterized in that~~ it includes at least one band ~~(91)~~ coaxially surrounding the ferrule ~~(5)~~ and placed in circumferential tension.

4/ (amended). A pipe ~~or the like~~ according to ~~any one of claims 1 to 3~~, wherein ~~characterized in that~~ said inside peripheral face ~~(23)~~ presents at least one continuous annular sealing portion in relief ~~(29)~~ facing said outside peripheral face ~~(12)~~ in a state of elastic and/or plastic transverse compression thereagainst, formed integrally with the ferrule ~~(5)~~.

5/ (amended). A pipe ~~or the like~~ according to ~~any one of claims 1 to 4~~, wherein ~~characterized in that~~ said outside peripheral face ~~(12)~~ and said inside peripheral face ~~(23)~~ flare in the longitudinal direction ~~(13)~~ going away from said front face ~~(11)~~ and relative to the transition ~~(22)~~ between the ferrule ~~(5)~~ and the skirt ~~(6)~~.

6/ (amended). A pipe ~~or the like~~ according to claims 4 and 5 wherein ~~in combination, characterized in that~~ said continuous annular portion in relief ~~(29)~~ is in the form of a rib ~~(29)~~ and there is only one of them.

7/ (amended). A pipe ~~or the like~~ according to ~~any one of~~ claims 1 ~~to 6~~, wherein ~~characterized in that~~ said inside peripheral face ~~(23)~~ is fastened to said outside peripheral face ~~(12)~~ by annular adhesive between them, ~~in particular continuous adhesive (52)~~.

8/ (amended). A pipe ~~or the like~~ according to ~~any one of~~ claims 1 ~~to 7~~, wherein ~~characterized in that~~ it includes at least one continuous sealing ring of plastic material interposed between said inside peripheral face ~~(23)~~ and said outside peripheral face ~~(12)~~.

9/ (amended). A pipe ~~or the like~~ according to ~~any one of~~ claims 1 ~~to 8~~, wherein ~~characterized in that~~ it includes an annular sealing gasket ~~(18)~~ of an elastically compressible material interposed in elastic transverse compression stress between said inside peripheral face ~~(23)~~ and said outside peripheral face ~~(12)~~, at least in the immediate vicinity of said front face ~~(11)~~.

10/ (amended). A pipe ~~or the like~~ according to claim 9, wherein ~~characterized in that~~ said outside peripheral face ~~(12)~~ presents a localized annular setback ~~(17)~~ at

least in the immediate vicinity of said front face~~(11)~~ and in that said gasket~~(18)~~ is received over a fraction of its transverse dimension in said setback~~(17)~~.

11/ (amended). A pipe ~~or the like~~ according to claim 9 ~~or claim 10, wherein characterized in that~~ said gasket~~(18)~~ is in the form of a film~~(18)~~.

12/ (amended). A pipe ~~or the like~~ according to claim 11, wherein ~~characterized in that~~ said film~~(18)~~ extends from said front face~~(11)~~ over a longitudinal dimension shorter than the respective longitudinal dimensions of said outside peripheral face~~(12)~~ and of inside peripheral face~~(23)~~.

13/ (amended). A pipe ~~or the like~~ according to claim 11 ~~or claim 12, wherein characterized in that~~ said inside peripheral face~~(23)~~ is fastened to said film~~(18)~~ by annular adhesive between them, ~~in particular continuous annular adhesive~~~~(53)~~.

14/ (amended). A pipe ~~or the like~~ according to ~~any one of claims 11 to 13, wherein characterized in that~~ said film~~(18)~~ presents at least one continuous annular bulge~~(77)~~ spaced apart longitudinally from said front face~~(11)~~ by a distance which is shorter than the respective longitudinal dimensions of said outside peripheral face~~(12)~~ and said inside peripheral face~~(23)~~ causing an increase in said

tension and in said pressure that is localized longitudinally.

15/ (amended). A pipe ~~or the like~~ according to claim 14, wherein ~~characterized in that~~ said continuous annular bulge ~~(77)~~ corresponds to a continuous annular groove ~~(79)~~ in said inside peripheral face ~~(23)~~.

16/ (amended). A pipe ~~or the like~~ according to ~~any one of claims 1 to 15,~~ wherein ~~characterized in that~~ the inside of the ring ~~(4)~~ presents longitudinal abutment means ~~(34)~~ for engaging said front face ~~(11)~~, the abutment means being located at the transition ~~(22)~~ between the ferrule ~~(5)~~ and the skirt ~~(6)~~ projecting transversely relative to said inside peripheral face ~~(23)~~ and being placed facing said front face ~~(11)~~.

17/ (amended). A pipe ~~or the like~~ according to claim 16, wherein ~~characterized in that~~ the skirt ~~(6)~~ also presents a longitudinal inside peripheral face ~~(26)~~, and in that the abutment means ~~(34)~~ also form a transverse projection relative thereto to serve as a longitudinal abutment for said male endpiece ~~(7)~~.

18/ (amended). A pipe ~~or the like~~ according to claim 17, wherein ~~characterized in that~~ the abutment means ~~(34)~~ comprise a transverse annulus ~~(34)~~ that is

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projecting catch—(69) engaged in a depression—(72) in the outside peripheral face—(12) to hold the ferrule—(5) longitudinally on the cylinder—(2).

23/ (amended). A pipe—~~or the like~~ according to claim 22, wherein ~~characterized in that~~ said depression—(72) is in the form of a transverse annular groove—(72) in said outside peripheral face—(12).

24/ (amended). A pipe—~~or the like~~ according to claim 22—~~or claim 23~~, wherein ~~characterized in that~~ the ferrule (5) has a plurality of catches—(69) that are circumferentially localized, being regularly distributed circumferentially, all occupying the same longitudinal position and engaged in respective depressions—(72) or in said annular groove—(72).

25/ (amended). A pipe—~~or the like~~ according to ~~any one of claims 1 to 24~~, wherein ~~characterized in that~~ the ferrule—(5) is fastened to the cylinder—(2) by transverse pins—(76) that are regularly distributed circumferentially.

26/ (amended). A female end ring for making a pipe—~~or the like~~ according to ~~any one of claims 1 to 25~~, presenting a longitudinal axis—(9) and ~~constituting~~ comprising:

- ~~firstly~~—a longitudinal ferrule—(5) defined in particular by a longitudinal inside peripheral face—(23);
and

- ~~secondly~~ a longitudinal skirt ~~(6)~~ situated axially in line with the ferrule ~~(5)~~,

~~the ring being characterized in that the ferrule (5) is being~~ elastically expandable circumferentially.

27/ (amended). A female end ring according to claim 26, wherein ~~characterized in that~~ said inside peripheral face ~~(23)~~ presents at least one continuous annular portion in relief ~~(29)~~ that is elastically and/or plastically compressible transversely and that is integral with the ferrule ~~(5)~~.

28/ (amended). A female end ring according to claim 26 ~~or claim 27~~, wherein ~~characterized in that~~ said inside peripheral face ~~(23)~~ flares in the longitudinal direction ~~(13)~~ going away from the transition ~~(22)~~ between the ferrule ~~(5)~~ and the skirt ~~(6)~~.

29/ (amended). A female end ring according to claims 27 and ~~28~~ wherein ~~in combination, characterized in that~~ said continuous annular portion in relief ~~(29)~~ is in the form of a rib ~~(29)~~, and there is only one of them.

30/ (amended). A female end ring according to ~~any one of claims 26 to 29~~, ~~characterized in that it presents~~ further comprising abutment means ~~(34)~~ on the inside at the transition ~~(22)~~ between the ferrule ~~(5)~~ and

the skirt—(6), the abutment means projecting transversely relative to said inside peripheral face—(23).

31/ (amended). A female end ring according to claim 30, wherein ~~characterized in that~~ the skirt—(6) also presents a longitudinal inside peripheral face—(26) and in that the abutment means—(34) also project transversely relative thereto.

32/ (amended). A female end ring according to claim 31, wherein ~~characterized in that~~ the abutment means—(34) comprise a circumferentially continuous transverse annulus (34) of uniform longitudinal dimension.

33/ (amended). A female end ring according to ~~any one of claims 26 to 32~~, wherein ~~characterized in that~~ the inside of the skirt—(6) is shaped—(63) suitably to receive and to hold at least one transverse annular sealing gasket (62).

34/ (amended). A female end ring according to claim 33, wherein ~~characterized in that~~ the inside of the skirt (6) is integral with at least one transverse annular sealing gasket—(62).

35/ (amended). A female end ring according to ~~any one of claims 26 to 34~~, wherein ~~characterized in that~~ the ferrule—(5) presents a transverse annular edge—(25) longitudinally opposite from the transition—(22) between

the ferrule—(5) and the skirt—(6), and projecting transversely relative to said inside peripheral face—(23) in the immediate vicinity of said edge—(25) at least one catch—(69).

36/ (amended). A female end ring according to claim 35, wherein ~~characterized in that~~ the ferrule—(5) has a plurality of catches—(69) which are circumferentially localized, which are regularly distributed circumferentially, and all of which occupy the same longitudinal position.

37/ (amended). A female end ring according to ~~any one of claims 26 to 36,~~ wherein ~~characterized in that~~ the ferrule—(5) and the skirt—(6) present respective shapes and transverse dimensions suitable for enabling a plurality of rings—(4) to be nested releasably and coaxially by nesting the ferrule—(5) of one with the skirt—(6) of another.

38/ (amended). A method of manufacturing a pipe ~~or the like according to any one of claims 1 to 25, the pipe or the like being~~ of the type comprising:

- a concrete cylinder—(2) possessing at least one annular end—(3) of determined longitudinal axis—(9), ~~defined in particular~~ by a longitudinal outside peripheral face—(12) and by a transverse front face—11;

- a female end ring—(4) coaxial with said end—(3) and secured thereto, the ring consisting in:

- firstly a longitudinal ferrule—(5) for securing to the cylinder—(2), the ferrule being defined in particular by a longitudinal inside peripheral face—(23) fitting snugly against said outside peripheral face—(12) in the immediate vicinity of said front face—(11); and

- secondly a longitudinal skirt—(6) projecting longitudinally over said front face—(11) to engage coaxially on a male endpiece—(7) of another pipe—(8) or the like,

said method comprising an initial step ~~of consisting in~~ prefabricating the ring, —(4) and being characterized in that ~~it further comprises the following succession of steps:~~

a) prefabricating the cylinder—(2) independently of the ring, the ring—(4) ~~being in accordance with any one of claims 26 to 37 and~~ being dimensioned in such a manner that, at a determined longitudinal distance from the transition—(22) between the ferrule—(5) and the skirt—(6), and in the absence of the ring—(4) being expanded circumferentially, said inside peripheral face—(23) presents transverse dimensions that are smaller than those presented by said outside peripheral face—(12) at the same

longitudinal distance from said front face—(11), but sufficiently close thereto to be capable of being increased to said dimensions by putting the ferrule—(5) under circumferential elastic tension; and

b) engaging the ferrule—(5) coaxially on the annular end—(3) of the cylinder—(2) to a determined relative position in which said transition—(22) coincides longitudinally with said front face—(11), and fastening the ferrule—(5) to the cylinder—(2) in said determined relative position by placing said ferrule—(5) in a state of circumferential elastic tension providing sealing relative to said outside peripheral face—(12) by said inside peripheral face—(23) applying thereto transverse pressure that is distributed circumferentially in continuous manner.

39/ (amended). A method according to claim 38, wherein ~~characterized in that~~ said circumferential elastic tension is such that said inside peripheral face—(23) is fastened at least in part to said outside peripheral face—(12) by the mutual friction effect that results from said transverse pressure.

40/ (amended). A method according to claim 39, wherein ~~characterized in that~~ said effect is reinforced by banding the ferrule—(5) in said determined relative position.

41/ (amended). A method according to ~~any one of claims~~
38 ~~to 40~~, wherein ~~characterized in that~~ coaxial engagement
of the ferrule ~~(5)~~ on the annular end ~~(3)~~ of the cylinder
~~(2)~~ during step b) is facilitated by placing the ferrule
~~(5)~~ in a state of circumferential expansion greater than
that which corresponds to said state of circumferential
elastic tension, until said relative position has been
reached, and

in that the ferrule ~~(5)~~ is allowed to leave said state
of circumferential expansion so as to allow said transverse
pressure to be established once said relative position has
been reached.

42/ (amended). A method according to claim 41, wherein
~~characterized in that~~ the ferrule ~~(5)~~ is placed in said
state of circumferential expansion by means selected from
the group comprising mechanical means ~~(80)~~ and thermal
means.

43/ (amended). A method according to ~~any one of claims~~
38 ~~to 42~~, wherein ~~characterized in that~~, respectively during
the initial step and during step a), the ring ~~(4)~~ and the
cylinder ~~(2)~~ are prefabricated in such a manner that said
outside peripheral face ~~(12)~~ and/or said inside peripheral
face ~~(23)~~ flare relative to their respective longitudinal
axes ~~(9)~~ in a longitudinal direction ~~(13)~~ going away

respectively from said front face—(11) and from the transition—(22) between the ferrule—(5) and the skirt—(6).

44/ (amended). A method according to claim 43, ~~wherein characterized in that~~ during step a) the cylinder (2) is prefabricated in such a manner that said outside peripheral face—(12) flares more than does said inside peripheral face—(23) relative to their respective longitudinal axes—(9).

45/ (amended). A method according to ~~any one of~~ claims 38 ~~to 44~~, wherein ~~characterized in that~~ between steps a) and b), a ring of adhesive—(52), ~~in particular a continuous ring,~~ is deposited on a localized zone of said outside peripheral face—(12) and/or of said inside peripheral face (23) selected in such a manner that when implementing step b) and thereafter said zone constitutes a zone of mutual contact via said adhesive—(52) and of application of said transverse pressure.

46/ (amended). A method according to ~~any one of~~ claims 38 ~~to 45~~, wherein ~~characterized in that~~ between steps a) and b), at least one continuous ring of plastic sealing material is placed on said outside peripheral face—(12) and/or said inside peripheral face—(23), and in that during step b), said plastic sealing material between said inside

peripheral face—(23) and said outside peripheral face—(12) is caused to be flattened and/or to creep.

47/ (amended). A method according to ~~any one of claims 38 to 46, wherein characterized in that~~ between steps a) and b), a sealing gasket—(18) of elastically compressible material is put into place on said outside peripheral face (12) at least in the immediate vicinity of said front face (11),

and in that during step b), said gasket—(18) is put into elastic transverse compression stress between said inside peripheral face—(23) and said outside peripheral face—(12).

48/ (amended). A method according to claim 47, ~~wherein characterized in that~~, during step a), the cylinder (2) is prefabricated in such a manner that said outside peripheral face—(23) presents a localized annular setback (17) at least in the immediate vicinity of said front face (11), and in that between steps a) and b), said gasket—(18) is put into place by being received over a fraction of its transverse dimension in said setback—(16).

49/ (amended). A method according to claim 47 wherein ~~or claim 48, characterized in that~~ said gasket—(18) is selected in such a manner that it is in the form of a film (18).

50/ (amended). A method according to claim 49, wherein ~~characterized in that~~ said film ~~(18)~~ is selected and placed in such a manner that it extends from said front face ~~(11)~~ over a longitudinal dimension that is less than the longitudinal dimensions respectively of said outside peripheral face ~~(12)~~ and of said inside peripheral face ~~(23)~~.

51/ (amended). A method according to claim 49 ~~or claim~~ 50, wherein ~~characterized in that~~ between steps a) and b), after said film ~~(18)~~ has been put into place, a ring of adhesive ~~(53)~~, ~~in particular a continuous ring~~, is deposited on a localized zone of said film ~~(18)~~ and/or of said inside peripheral face ~~(23)~~ selected in such a manner that during implementation of step b) and subsequently, said zone constitutes a zone of mutual contact via said adhesive ~~(53)~~ and of application of said transverse pressure.

52/ (amended). A method according to ~~any one of claims~~ 45 ~~and 51~~, wherein ~~characterized in that~~ said adhesive ~~(53)~~ is selected in such a manner that while in the fresh state it constitutes a lubricant associating implementation of step b) by progressive forced engagement of the ferrule ~~(5)~~ coaxially onto the annular end ~~(3)~~ of the cylinder ~~(2)~~, and subsequently serves to fasten them together.

53/ (amended). A method according to ~~any one of claims~~
~~49 to 51, wherein or according to claim 52 as dependent on~~
~~claim 51, characterized in that~~ said film ~~(18)~~ is selected
and placed in such a manner as to present at least one
continuous annular bulge ~~(77)~~ longitudinally spaced apart
from said front face ~~(11)~~ by a distance which is shorter
than the respective longitudinal dimensions of said outside
peripheral face ~~(12)~~ and said inside peripheral face ~~(23)~~,
so as to give rise to a longitudinally localized increase
in said tension and in said pressure.

54/ (amended). A method according to claim 53 wherein,
~~as dependent on any one of claims 39 to 41, characterized~~
~~in that~~ the hardness and the dimensions of said continuous
annular bulge ~~(77)~~ are selected and step b) is implemented
in such a manner that in said determined relative position
said continuous annular bulge ~~(77)~~ causes a corresponding
continuous annular groove ~~(79)~~ to be formed in the inside
peripheral face ~~(23)~~, ~~in particular~~ by localized plastic
deformation of the ferrule ~~(5)~~.

55/ (amended). A method according to ~~any one of claims~~
~~38 to 54, wherein~~ characterized in that for a ring (4) in
~~accordance with any one of claims 30 to 32, during step b)~~
coaxial engagement of the ferrule ~~(5)~~ on the annular end
(3) of the cylinder ~~(2)~~ is stopped when the longitudinal

abutment means—(34) come into abutment against said front face—(11).

56/ (amended). A method according to claim 55 wherein, ~~as it depends on any one of claims 49 to 53, characterized in that~~ between steps a) and b), an annular transverse rim of said film—(18) is formed on said front face—(11), and

in that during step b), said coaxial engagement is stopped when the longitudinal abutment means—(34) come into abutment against said front face—(11) via said rim.

57/ (amended). A method ~~acorn~~ according to ~~any one of~~ claims 38 wherein ~~to 56, characterized in that for a ring (4) in accordance with claim 33,~~ in step a) or after step b), at least one transverse annular sealing gasket—(62) for engaging the male endpiece is secured to the inside of the skirt—(6).

58/ (amended). A method according to ~~any one of~~ claims 38 ~~to 57,~~ wherein ~~characterized in that for a ring (4) in accordance with claim 35 or claim 36,~~ during step a), the cylinder—(2) is prefabricated in such a manner as to present in said outside peripheral face—(12) at a longitudinal distance from said front face—(11) corresponding to the longitudinal distance between said catch—(69) and the transition—(22) between the ferrule—(5) and the skirt—(6), at least one depression—(72) for

receiving said catch—(69), there being at least one such catch, and in that step b) is implemented by progressively engaging the ferrule—(5) by force coaxially on the annular end—(3) of the cylinder—(2) and by pressing said at least one catch—(69) on said outside peripheral face—(12) by increasing elastic deformation of the ring—(4) and by allowing it to engage in said at least one depression—(72) by resilient return once said determined relative position has been reached.

59/ (amended). A method according to claim 58, wherein ~~characterized in that~~ during step a) said depression—(72) is implemented in the form of a transverse annular groove (72) in said outside peripheral face—(12).

60/ (amended). A method according to ~~any one of claims 38 to 59~~, wherein ~~characterized in that~~ after step b) the ferrule—(5) is fastened to the cylinder—(2) by transverse pins—(76) that are regularly distributed circumferentially.